PARTICULATE COATING APPARATUS WITH PARTICULATE CONTROL DEVICE

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuing application of application Ser. No. 07/547,457, filed Jul. 3, 1990, now abandoned.

The present invention relates to an apparatus and method of coating a foodstuff with a particulate material.

BACKGROUND OF THE INVENTION

Normally, during the coating of foodstuffs with particulate material, large amounts of coating material fall off the foodstuff during the coating process, and it is important that this excess coating material is reused. In conventional equipment used, for example, in coating frozen fish on both sides with breadcrumbs, excess coating material is normally transported upwards for reuse by means of elevator screws. However, not only are delicate crumbs damaged by screws, but also large amounts of coating material are always in circulation and exposed to the warm air of the environment which is not desirable since it is important that the coating material should be maintained at as low a temperature as possible. In addition, in the coating of some products using conveyor belts, e.g., ice cream with crumbs, it is desirable to adjust the thickness of the upper and lower layer independently. For instance, if the lower layer is too thick, there may be too many crumbs in circulation which could cause problems with the tightness of the system. Therefore, even nowadays, coating of certain products with particulate material is carried out manually.

In our U.S. Pat. No. 4,762,083, a completely new principle is described for coating a foodstuff with a particulate material using an apparatus which is not only very much simpler but also enables very much smaller amounts of coating material to be in circulation at any period in time when compared with conventional apparatus. This apparatus comprises:

a drum capable of rotating about a substantially horizontal longitudinal axis; p1 a first horizontal conveyor adapted to travel through the drum;

a second horizontal conveyor below the first conveyor, adapted to travel in a direction opposite the first conveyor, the second conveyor comprising at least first, second and third successive endless belts each having a horizontal upper run and a gap between each successive pair of belts, the second belt having an inclined portion extending to a position below the first belt, the gap between the second and third belts being situated within the drum;

means for feeding particulate material onto the first conveyor; and

means for feeding a foodstuff onto the first belt; such that in operation, particulate material is fed from the first conveyor onto the foodstuff on the first belt for coating the foodstuff on an upper side, the coated foodstuff is transported to the second belt with excess particulate material falling off the first belt onto the inclined portion of the second belt and is conveyed to the horizontal upper run of the second belt to form a layer on which the coated foodstuff lies after being transported from the first belt to the horizontal upper run of the second belt for coating the foodstuff on a bottom side, the coated foodstuff is fed to the third belt with further particulate material falling through the gap between the second and third belts onto an inside wall of the drum which rotates for conveying the further material to a position above the first conveyor upon which the further material falls by gravity, and the first conveyor transports the further material back to the second conveyor.

However, although this apparatus enables the foodstuff to be coated on both sides, there can be problems with the tightness of the system due to the presence of too many crumbs in circulation which is caused by the formation of a layer of particulate material on the second belt of the second horizontal conveyor which is much too thick.

SUMMARY OF THE INVENTION

It has been found that the thickness of the layer of particulate material on the second belt of the second horizontal conveyor can be controlled independently of the thickness of the particulate material on the upper surface of the foodstuff by means of an adjustable plate positioned beneath the upper run of the first belt of the second conveyor to control the amount of particulate material from the first belt and deposited onto the inclined portion of the second belt of the second conveyor.

Accordingly, the present invention provides an apparatus for coating a foodstuff with particulate material comprising:

a drum capable of rotating about a substantially horizontal longitudinal axis;

a first conveyor adapted to travel through the drum;

a second conveyor below the first conveyor, the second conveyor comprising at least first, second and third successive endless belts each having a substantially horizontal upper run and a gap between each successive pair of belts, the second belt having an inclined portion extending to a position below the first belt, the gap between the second and third belts being situated within the drum;

means for feeding particulate material onto the first conveyor; and

means for feeding a foodstuff onto the first belt; such that in operation, particulate material is fed from the first conveyor onto the foodstuff on the first belt for coating the foodstuff on an upper side, the coated foodstuff is transported to the second belt with excess particulate material falling off the first belt onto the portion of the second belt below the first belt and is conveyed to the substantially horizontal upper run of the second belt to form a layer on which the coated foodstuff lies after being transported from the first belt to the substantially horizontal upper run of the second belt for coating the foodstuff on a bottom side, the coated foodstuff is fed to the third belt with further particulate material falling through the gap between the second and third belts onto an inside wall of the drum which rotates for conveying the further material to a position above the first conveyor upon which the further material falls by gravity, and the first conveyor transports the further material back to the second conveyor characterised in that an adjustable plate is positioned beneath the level of the upper run of the first belt of the second conveyor to control the amount of particulate material falling from the first belt and deposited onto the portion of the second belt of the second conveyor which lies below the first belt of the second conveyor.

Advantageously, there is a means positioned below the second conveyor for collecting the excess particulate material which does not fall and become deposited onto the